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ACIS - 1658/85  
10 December 1985

MEMORANDUM FOR: Director of Central Intelligence  
Deputy Director of Central Intelligence ←  
Deputy Director for Intelligence

--EYES ONLY--

FROM:

  
Chief, Arms Control Intelligence Staff

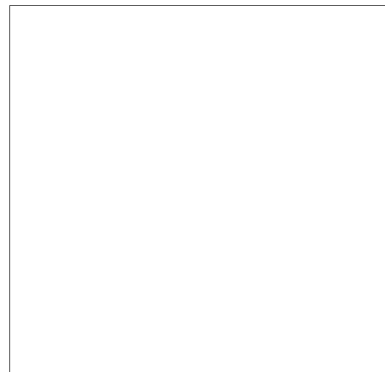
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SUBJECT: Background Information (U)

1. This "fast-track" memorandum is for your information. (U)
2. Attached are copies of two pieces of arms control correspondence which I was given in private over the last several days. One is from Director Adelman and deals with verification; the other is from Admiral Crowe and deals with the informal Soviet proposal about the Krasnoyarsk radar. When these copies were handed over, it was made clear that they were intended solely for you. (S/NF)
3. We are already extremely busy on verification, going down the road outlined in the 25 April memorandum for Mr. McFarlane from Director Adelman and you. Moreover, the Executive Branch will be busy with the issue of the Krasnoyarsk radar. I sense that the White House wants to solve that problem if it can; while the latest Soviet informal proposal was deemed unacceptable, the follow-on proposals (depending on their content) might arguably be in the US interest. (S/NF)
4. One of the reasons these memoranda were given to me, even in private, is that you have been willing to share your correspondence on arms control issues. I have made the point with my colleagues, in the Executive Branch's arms control work, that it ought to be in their interest to ensure that you, as a Cabinet Officer, understand the views of such executives as Director Adelman and others. (C/NF)
5. If there is anything further we can do to assist you here, please call and let me know. (U)

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Attachments:  
As stated



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UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY  
WASHINGTON

OFFICE OF  
THE DIRECTOR

November 27, 1985

MEMORANDUM FOR THE ASSISTANT TO THE PRESIDENT  
FOR NATIONAL SECURITY AFFAIRS

SUBJECT: Next Steps in NST and Verification

To follow up on the summit, I believe verification should be a first priority item. Specifically, in addition to preparing draft treaty provisions to reflect our counterproposal, we should have full verification provisions ready to table during the next session in the START and INF areas.

As you know, the Joint Statement declared that "during the negotiation of these agreements, effective measures for verification of compliance with obligations assumed will be agreed upon." My reasons for pushing verification now are as follows:

- o This would underline the importance of effective verification and show early follow-up on the Joint Statement. Unveiling new draft treaties with verification provisions would fit with our pledge to "accelerate progress" in NST.
- o Assuming verification measures are going to be one of the more difficult areas in the talks, as we expect, it is better to smoke out the concerns and options earlier rather than later.
- o If there are to be stumbling blocks to progress, let the light be on Soviet intransigence on verification and other START/INF provisions, rather than on SDI. Putting our verification cards on the table will reveal where the stumbling blocks to progress lay. This is particularly in our interest as the Soviets no doubt will continue every effort to portray SDI as the key or only stumbling block.

I am putting priority on this internally in ACDA, and have asked my staff promptly to develop draft treaty provisions and related verification sections, as needed. Obviously, any provisions will require vetting and work by the other interested agencies and SACG.

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It is clear to me that this will not be accomplished in time for the next sessions without a strong push from you personally and your staff. It will take some time and effort but we need to do it. Therefore, I hope you will be able to focus on this early and keep pressure on it.

A handwritten signature in black ink, appearing to read 'Ken', with a long horizontal stroke extending to the right.

Kenneth L. Adelman

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THE JOINT CHIEFS OF STAFF  
WASHINGTON, D.C. 20301

THE JOINT STAFF

JCSM 372-85 .  
19 October 1985

MEMORANDUM FOR THE ASSISTANT TO THE PRESIDENT FOR NATIONAL  
SECURITY AFFAIRS

Subject: Soviet Informal Proposal Concerning Radars (S)

1. (S) The Joint Chiefs of Staff have considered the informal Soviet proposal to terminate construction activities on the radars at Thule and Krasnoyarsk as well as to discontinue activities for that purpose at Fylingdales. They do not support such an agreement.
2. (S) Furthermore, the Joint Chiefs of Staff have determined that the Ballistic Missile Early Warnings Systems (BMEWS) sites at Thule and Fylingdales are pivotal to the United States' ability to provide high confidence tactical warning and attack assessment. In this regard the modernization of the radar sites is deemed to be a military necessity. Since the U.S. BMEWS radars were deployed in the 1960s, changes in the threat have reduced their effectiveness. Soviet deployment of missiles with smaller radar cross-sections, in larger numbers equipped with multiple independently targeted reentry vehicles (MIRVs), has taxed the capability of our current BMEWS equipment. The existing Thule and Fylingdales radars have poor range resolution and inadequate target discrimination. These shortcomings in technical capability could result in a significant under-count of raid size and inaccurate impact and timing predictions. Thus, the modernization of Thule and Fylingdales is necessary to insure that the National Command Authority receives high confidence, immediate reports of launches - to include specific data on launch origins, missile types, and booster counts.
3. (S) To correct these severe deficiencies, the US has established a BMEWS modernization program. It is described in detail in the enclosed paper. The objectives of the program are to obtain tracking, processing and reporting on a much larger number of smaller, more closely spaced objects; to obtain more accurate impact predictions and reduce chances of false warnings; and to resolve the increasing problems which all equipment has as it gets older. The modernization program involves replacing the radars at Thule and those at Fylingdales with large phased-array radars. The improved sensors will provide the needed tactical warning and attack assessment.

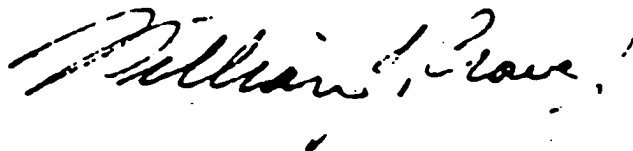
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4. (S) Due to the importance of BMEWS modernization to national security, the Joint Chiefs of Staff believe that cessation of these programs is not negotiable, even if the Soviets were to agree to dismantle or destroy Krasnoyarsk. Furthermore, the Joint Chiefs of Staff believe that Krasnoyarsk radar is a violation of the ABM Treaty that requires unilateral, Soviet corrective action. Thus, any Soviet remedial actions taken with regard to Krasnoyarsk are legally required and not the proper subject for negotiations.

5. (S) Nonetheless, the Joint Chiefs of Staff recommend that the United States welcome the Soviet willingness to cease construction at Krasnoyarsk but insist upon dismantlement or destruction of the facility.

For the Joint Chiefs of Staff:

A handwritten signature in dark ink, appearing to read "William J. Crowl". The signature is fluid and cursive, with a large initial "W" and a distinct "Crowl" at the end.

Enclosure  
a/s

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## US Ballistic Missile Early Warning System Modernization Program

To provide the National Command Authority with timely, accurate warning and attack characterization of a ballistic missile attack launched against North America and Europe, the US has deployed three ballistic missile early warning systems (BMEWS) at Thule, Greenland, Fylingdales, UK and Alaska and phased-array radars located in the continental US for ICBM and SLBM attack warning.

Warning System Requirements Because of the magnitude of the ballistic missile threat, attack warning is critical. To detect an attack, which currently could consist of more than a thousand boosters and thousands of warheads, the attack warning system must perform several key functions: determine the size of an attack; the country initiating the attack; the country under attack, and probable impact locations. It must do all of this in a matter of minutes.

An array of sensors is deployed to perform such functions. Data on launched missiles would be collected and reported by the sensors, sent to command and control centers and processed to derive additional information on the nature and potential effects of the attack. Data would be used to reach decisions regarding the survival of US forces and cities. The data will also allow National Command Authorities to determine the nature, timing, and scope of a US response.

Reviewed against these requirements, the BMEWS radars at Thule and Fylingdales are, among other purposes, essential to confirm an attack, its size, and impact points. These radars fall far short of adequately fulfilling their mission, particularly in light of today's threat. Today we must detect and track much larger numbers of smaller objects than the radars were intended for when they were installed more than 20 years ago.

Although the present radars can detect missiles at long range, they lack the sensitivity or resolution necessary to determine accurately how many missiles are in a large or dense attack. The radar will "see" all returns in a range resolution cell as a single return. The 2 msec pulse width and lack of pulse compression result in a 383 NM resolution cell. In a dense raid, the probability of multiple objects occupying the same range cell is high and the likelihood of BMEWS failing to report on objects is similarly high. Also BMEWS views multiple returns in a given range cell as a single return (pseudo-target) located at the centroid of all the returns in a given cell. This pseudo-

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target, when processed by the computer, creates false impact predictions. As a result of these shortcomings, it is estimated the BMEWS would report on a maximum of only 20 percent of the missiles in a large raid and reports generated would be inaccurate. The BMEWS does not now fulfill the warning system requirements.

Modernization Programs Because of the inadequacy of the BMEWS radars to provide the attack assessment and warning required and in view of the fact that the systems are aging and becoming increasingly difficult to maintain, the modernization program is essential. The use of phased-arrays was preferred over the dish antenna for several reasons.

Phased arrays possess advantages in speed and agility over conventional dish antennas. Nearly instantaneously, the direction of a phased array beam can be switched tens of degrees. (Each face of the radar can be scanned in azimuth over a 120 degree range. Two faces combine to provide coverage of 240 degrees.) Far more time is required to swing an often massive dish antenna by the same amount.

The proposed sensor upgrades will improve BMEWS system operations in three primary areas: search volume; object resolution and tracking accuracy; and traffic handling. For Thule the phased array will expand the search fence by 80 degrees in azimuth, and extend the maximum operational range by approximately 200 NM. Although the minimum search range increases, the minimum tracking range will decrease by 100 NM. The most significant performance gains are object resolution and tracking capability. The resolution cell size reduction from 383 NM to 120 ft should enable the system to detect, resolve, and report on 90-95 percent of the missiles in a raid. The speed of the electronically steered phased array combined with sensitivity of the system is estimated to provide the capability to maintain 800 track files per minute.

A similar enhanced capability will accrue to the Fylingdales site.

#### Status

Thule The Thule site was established in the 1960s and equipped with large fixed position detection radars (DR) and one movable tracking radar (TR) which acts as a backup to the DR and provides a longer and more precise track on selected objects. In addition to its ICBM warning mission, Thule provides warning of SLBMs launched from northern Soviet waters and has the added duty of tracking satellites.

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The phased array radar facility is being erected on top of an existing building at Thule. The steel structure is now complete and enclosed. The array plates have been installed and the radar, in its current state of construction, resembles the PAVE PAWS radars and will be virtually identical to PAVE PAWS upon completion.

Module and element assembly is proceeding apace in CONUS. Initial operational capability (IOC) is scheduled for October 1986. After the system is fully functional and reliability has been established, the present detection radars will be dismantled and the tracking radar will be removed. There will, however, be an overlap of several months during which the old radar continues to function while the phased array radar operates intermittently for check-out.

Fylingdales The BMEWS site in Fylingdales, U.K. (near Whitby in Yorkshire) was established in 1962 and operated and maintained by the UK to provide warning and attack assessment data on ballistic missile raids launched against the United States and Southern Canada from the Sino-Soviet landmass and broad ocean areas within the coverage of the system. The site also provides warning and assessment of sea-launched/intermediate-range/medium-range ballistic missile (SLBM/IRBM/MRBM) raids directed against the U.K. and forces assigned to the United States European Command (USEUCOM). The system has the secondary mission of tracking objects in outer space. The existing site at Fylingdales supports these missions using three tracking radars which have steerable 84 foot dish antennas. The MRBM/IRBM threat is initially given tracking priority with the existent radar since the response time for this type of attack is extremely short.

The operational concept for the modernization of this site calls for a three-faced phased array radar providing 360 degrees of azimuth coverage. The phased array radar building will be shaped like a blunted pyramid measuring about 110 ft on each of the three sides, and about 105 ft high. The building will house all of the electronic components of the new radar, as well as a new, larger Missile Impact Prediction (MIP) computer set, associated peripheral equipment, a new tactical operations room and required support equipment and communications gear.

Assuming the U.K. Government concurs in the U.S. plan for modernization, contract work can begin in late 1986. The modernization radar would then become operational in early FY 90, following which the existing system will be dismantled.

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Summary The provision of timely and accurate warning and assessment of a ballistic missile attack on the United States and on Europe is an extremely important mission and cannot be adequately conducted with antiquated equipment incapable of performing required functions. The modernization of the BMEWS radars at Thule and Fylingdales is essential to the command and control of our nuclear forces and thus to the maintenance of a strong deterrent.

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